

# TROPICAL DEPRESSION 09W

BEST TRACK TC-09W

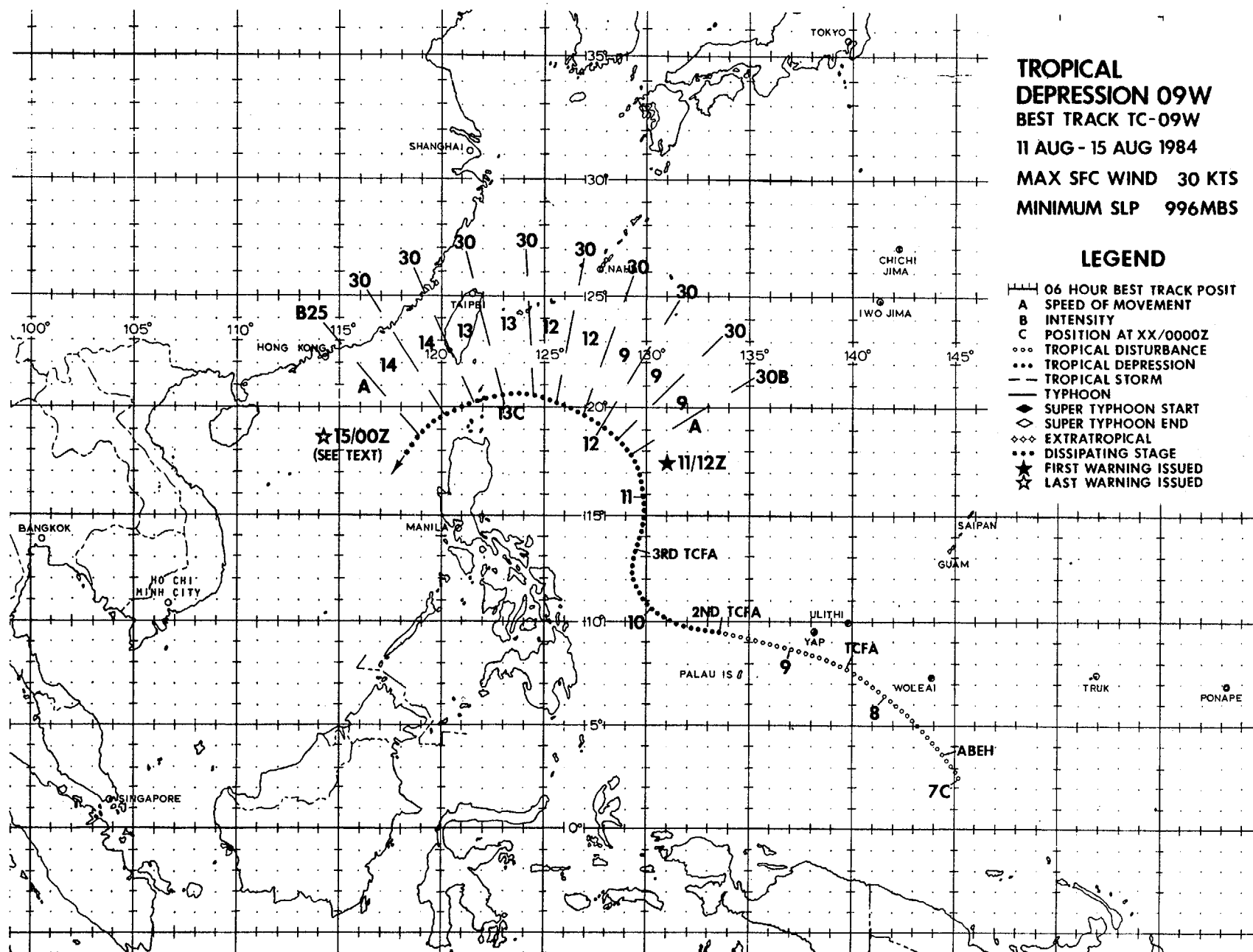
11 AUG - 15 AUG 1984

MAX SFC WIND 30 KTS

MINIMUM SLP 996MBS

## LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇ EXTRATROPICAL
- ... DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



# TROPICAL DEPRESSION (09W)

Tropical Depression 09W, just like its predecessor Tropical Storm Freda, was a difficult storm to warn on. The depression's low-level circulation remained weak and poorly organized which made it very difficult to locate. Extensive post-analysis indicates that JTWC warned on the mid-level circulation, which was co-located with the organized convection, rather than the ill-defined low-level center which remained well to the south of the main convection.

Tropical Depression 09W first appeared early on the 7th of August as a broad 1006 mb low in the Near-Equatorial Trough approximately 660 nm (1222 km) south of Guam. The disturbance was mentioned on the 070600Z Significant Tropical Weather Advisory (ABEH PGTW). As it moved to the northwest, the disturbance showed signs of increased organization on satellite imagery, prompting the issuance of a TCFA at 081200Z.

Aircraft reconnaissance on the afternoon of 9 August, indicated that the surface circulation associated with the disturbance was broad and weak. Only 10 to 15 kt (5 to 8 m/s) surface winds were observed with an MSLP of 1004 mb. The TCFA was reissued daily from the 9th to the 11th as the system continued to show convective organization and the presence of a surface circulation in the synoptic data. During this period, the disturbance was very slow to develop a favorable upper-level circulation. The 200 mb flow persisted in being unidirectional (easterly) over the convection. This easterly flow sheared the convection preventing the accumulation of warm, moist air at the low-to-mid levels and the attendant surface pressure drop.

The aircraft reconnaissance investigative flight on the morning of 10 August could not find a surface circulation center. By this time, the system had moved out of the Near-Equatorial Trough and had become the south-eastern extension of the monsoon trough.

Between 100600Z and 110600Z, the disturbance moved almost due north. This brought the disturbance under the influence of a TUTT cell located to the northwest near Taiwan. The 200 mb flow over the system now came from the south and was diffluent north through east of the surface circulation. Satellite imagery confirms this by indicating the presence of the heaviest convection in that area. At 110729Z, aircraft reconnaissance closed-off a surface circulation center with 25 kt (13 m/s) surface winds and an MSLP of 1003 mb. Based on the improved upper-level wind flow and the closed circulation found by aircraft, the first warning on Tropical Depression 09W was issued at 111200Z.

The first six warnings on 09W forecast it to move to the northwest. These forecasts were based on objective forecast aids, including the One-Way Interactive Tropical Cyclone Model (OTCM). Upon post-analysis, these forecasts do not agree well with the synoptic situation present at the time. A low-to-middle level ridge was located to the

north of the depression. In retrospect, the more accurate and synoptically correct forecast, especially with such a weak system as Tropical Depression 09W, would have been a west-northwest to west track along the northern side of the monsoon trough.

Complicating the forecasting of Tropical Depression 09W was the difficulty in positioning the surface center. The surface circulation center was poorly organized because it was embedded in the monsoon trough. The displacement of the mid-to-upper level circulation to the north within the convection, made accurate positioning by satellite imagery of the actual low-level depression center very difficult. Figure 3-09-1 shows one of the few times that the weak, poorly defined, low-level circulation was visible on satellite imagery. Post-analysis of aircraft reconnaissance, synoptic, and satellite data, shows that the depression center, as reflected in the warning positions, was the middle-to-upper level center and not the weak and poorly defined surface circulation center which was located approximately 150 nm (278 km) to the south. JTWC warned on this mid-level feature until 150000Z when the convection finally dissipated over Taiwan and it was obvious that no significant low-level circulation persisted. It is now apparent that the surface center moved along the monsoon trough as a sheared, sometimes exposed low-level circulation from 111200Z to 131800Z and dissipated shortly thereafter as it merged with a cyclonic circulation in the northern South China Sea. This circulation would develop into Tropical Storm Gerald a few days later.

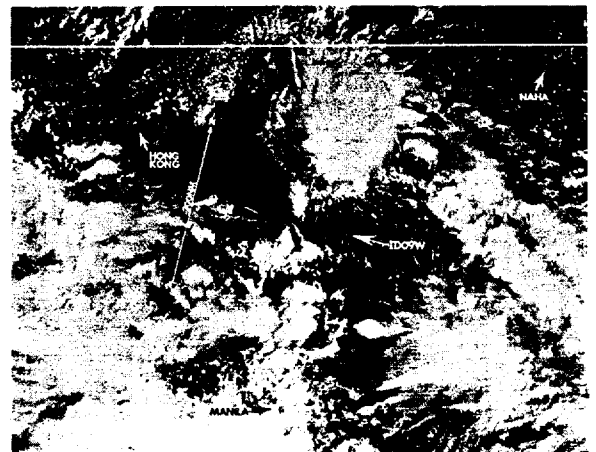


Figure 3-09-1. Tropical Depression 09W passing south of Taiwan. Note the poorly defined exposed low-level circulation located well to the south of the main convection. At the time, the depression's center was thought to be located underneath this convection. However, post-analysis now indicates the exposed low-level circulation was the actual location of the depression's center (130718Z August NOAA visual imagery).